

404 Rec'd PCT/PTO 23 OCT 1998

09/171690

Attorney's Docket No. 4501

CHAPTER II

TRANSMITTAL LETTER
TO THE UNITED STATES ELECTED OFFICE (EO/US)
(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP97/02151	25 April 1997	26 April 1996
TITLE OF INVENTION		
PISTE-MAINTENANCE TRACKLAYING VEHICLE		
APPLICANT(S)		
Helmut Kanzler and Michael Kuhn		

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231

ATTENTION: EO/US

NOTE: The completion of those filing requirements that can be made at a time later than 30 months from the priority date results from the Commissioner exercising his judgment under the authority granted under 35 USC 371(d). The filing receipt will show the actual date of receipt of the last item completing the entry into the national phase. See 37 CFR 1.491 which states: "An international application enters the national state when the applicant has filed the documents and fees required by 35 USC 371(c) within the periods set forth in § 1.494 and § 1.495."

WARNING: Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 CFR 1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing - 37 CFR 1.8 (2) (xi)).

NOTE: Documents and fees must be clearly identified as a submission to enter the national state under 35 USC 371 otherwise the submission will be considered as being made under 35 USC 111. 37 CFR 1.494(f).

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Transmittal Letter and the papers indicated as being transmitted therewith is being deposited with the United States Postal Service on this date October 23, 1998 in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EL212099952US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Marybeth Roy

(type or print name of person mailing paper)


Signature of person mailing paper

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 CFR 1.16(b).

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 CFR 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 1 of 8)

I. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. 371:

- (Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 2 of 8)

2. Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS	
<input checked="" type="checkbox"/>	TOTAL CLAIMS	27 - 20 =	7	x \$22.00 =	\$ 154.00	
	INDEPENDENT CLAIMS	1 - 3 =	0	x \$80.00 =		
	MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ \$260.00	
	BASIC FEE** <input type="checkbox"/> U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an international preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: <input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(1) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 CFR 1.492(a)(4)) \$96.00 <input type="checkbox"/> and the above requirements are not met (37 CFR 1.492(a)(1)) \$700.00 <input checked="" type="checkbox"/> U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: <input type="checkbox"/> has been paid (37 CFR 1.492(a)(2)) \$770.00 <input type="checkbox"/> has not been paid (37 CFR 1.492(a)(3)) \$1,040.00 <input checked="" type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR 1.492(a)(5)) \$910.00					
Total of above Calculations					= \$1,084.00	
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Affidavit must be filed also. (note 37 CFR 1.9, 1.27, 1.28)					
	Subtotal					\$1,084.00
	Total National Fee					\$1,084.00
	Fee for recording the enclosed assignment document \$40.00 (37 CFR 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".					\$40.00
TOTAL	Total Fees enclosed					\$1,124.00

*A separate check for \$40.00 is enclosed for the Assignment recordal.

*See attached Preliminary Amendment Reducing the Number of Claims.

- i. ☒ A check in the amount of \$1,084.00 to cover the above fees is enclosed.
- ii. ☐ Please charge Account No. _____ in the amount of \$ _____
A duplicate copy of this sheet is enclosed.

**WARNING: "To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 CFR § 1.495(b).

WARNING: If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 CFR § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.

3. ☒ A copy of the International application as filed (35 U.S.C. 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment. "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.

- a. ☐ is transmitted herewith.
- b. ☐ is not required, as the application was filed with the United States Receiving Office.
- c. ☒ has been transmitted
- i. ☒ by the International Bureau.
Date of mailing of the application (from form PCT/1B/308): 06 November 1997
- ii. ☐ by applicant on _____
Date

4. ☒ A translation of the International application into the English language (35 U.S.C. 371(c)(2)):

- a. ☒ is transmitted herewith.
- b. ☐ is not required as the application was filed in English.
- c. ☐ was previously transmitted by applicant on _____
Date
- d. ☐ will follow.

05171690-102299

5. ☒ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. 371(c)(3)):

NOTE: The Notice of January 7, 1993 points out that 37 CFR § 1.495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that: "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36.

- a. ☐ are transmitted herewith.
- b. ☐ have been transmitted
- i. ☐ by the International Bureau.
Date of mailing of the amendment (from form PCT/1B/308): _____
- ii. ☐ by applicant on (date) _____
Date
- c. ☒ have not been transmitted as
- i. ☒ applicant chose not to make amendments under PCT Article 19.
Date of mailing of Search Report (from form PCT/ISA/210.): 13 August 1997
- ii. ☐ the time limit for the submission of amendments has not yet expired.
The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.

6. ☒ A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. 371(c)(3)):

- a. ☐ is transmitted herewith.
- b. ☐ is not required as the amendments were made in the English language.
- c. ☒ has not been transmitted for reasons indicated at point 5(c) above.

7. ☒ A copy of the international examination report (PCT/IPEA/409)

- ☒ is transmitted herewith.
- ☐ is not required as the application was filed with the United States Receiving Office.

8. ☒ Annex(es) to the international preliminary examination report

- a. ☒ is/are transmitted herewith.
- b. ☐ is/are not required as the application was filed with the United States Receiving Office.

9. ☐ A translation of the annexes to the international preliminary examination report

- a. ☐ is transmitted herewith.
- b. ☐ is not required as the annexes are in the English language.

062207 069766

10. ☒ An oath or declaration of the inventor (35 U.S.C. 371(c)(4)) complying with 35 U.S.C. 115
- a. ☐ was previously submitted by applicant on _____
Date
- b. ☒ is submitted herewith, and such oath or declaration
- i. ☒ is attached to the application.
- ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. 1.70.
- iii. ☐ will follow.

II. Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
- a. ☐ is transmitted herewith.
- b. ☒ has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): 06 November 1997
- c. ☐ is not required, as the application was searched by the United States International Searching Authority.
- d. ☐ will be transmitted promptly upon request.
- e. ☐ has been submitted by applicant on _____
Date
12. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98:
- a. ☒ is transmitted herewith.
Also transmitted herewith is/are:
☒ Form PTO-1449 (PTO/SB/08A and 08B).
☒ Copies of citations listed.
- b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. 371(c).
- c. ☐ was previously submitted by applicant on _____
Date
13. ☒ An assignment document is transmitted herewith for recording.
A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☒ FORM PTO 1595 is also attached.

09474690-102398

14. ☒ Additional documents:
- a. ☒ Copy of request (PCT/RO/101)
 - b. ☒ International Publication No. WO 97/40996
 - i. ☒ Specification, claims and drawing
 - ii. ☐ Front page only
 - c. ☒ Preliminary amendment (37 C.F.R. § 1.121)
 - d. ☒ Other
Form PCT/IB/308

15. ☒ The above checked items are being transmitted
- a. ☒ before 30 months from any claimed priority date.
 - b. ☐ after 30 months.
16. ☐ Certain requirements under 35 U.S.C. 371 were previously submitted by the applicant on _____, namely:

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: Accurately count claims, especially multiple dependant claims, to avoid unexpected high charges if extra claims are authorized.

- ☒ The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 19-0079

☒ 37 C.F.R. 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: Because failure to pay the national fee within 30 months without extension (37 CFR § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.

☒ 37 C.F.R. 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

0917169 102207 06972760

☒ 37 C.F.R. 1.17 (application processing fees)

WARNING: While 37 CFR 1.17(a), (b), (c) and (d) deal with extensions of time under § 1.136(a), this authorization should be made only with the knowledge that: "Submission of the appropriate extension fee under 37 CFR 1.136(a) is to no avail unless a request or petition for extension is filed." Notice of Nov. 5, 1985 (1060 O.G. 27).

☐ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

NOTE: 37 C.F.R. 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 CFR 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

☐ 37 CFR 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).

Reg. No.: 35,985

Tel. No.: (617) 426-9180
Ext.: 110



SIGNATURE OF ATTORNEY

Arlene J. Powers
(type or print name of attorney)
Samuels, Gauthier & Stevens

P.O. Address
225 Franklin Street, Suite 3300
Boston, MA 02110

300 Rec'd PCT/PTO 23 OCT 1998

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Helmut Kanzler et al. GROUP: Unknown
SERIAL NO: Unknown EXAMINER: Unknown
FILED: Herewith
FOR: PISTE-MAINTENANCE TRACKLAYING VEHICLE

Assistant Commissioner of Patents
Washington, D.C. 20231
Sir:

PRELIMINARY AMENDMENT

Preliminary to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Please amend the specification as follows:

Page 1, lines 1 - 16, delete "comprising an internal combustion engine which is drivingly connected, preferably via a gear, to a drive sprocket of each track, and accessory drives for additional devices that are mountable on the piste-maintenance vehicle, such as rotary snow plow, front snow plow blower, or the like, and/or for vehicle components, such as a tilting device for platform and driver's cab or for track tensioning.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited on the date shown below in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EL212099952US addressed to the: Commissioner of Patents and Trademarks, Washington, D.C. 20231.


Marybeth Roy

Date: 10-23-98

Such a tracklaying vehicle is known in practice, with a hydrostatic drive being normally provided for the tracks. The drive is operated by the internal combustion engine, with a gear being optionally provided between internal combustion engine and hydrostatic gear or drive sprocket for controlling the individual tracks. Furthermore, such a tracklaying vehicle has a number of additional devices, such as a rotary snow plow, a front snow plow blower, a winch drive, or the like. Furthermore, adjusting mechanisms for the corresponding device carriers or for a snow clearing blade are provided for the additional devices or also for further vehicle means, tilting devices are provided, for instance, for the driver's cab or a platform, as well as a track tensioner, or the like."

line 1, after "vehicle" insert

-- Such a vehicle is known from WO94/09548. In the prior-art vehicle, an electric motor for a drive wheel of a track is driven by an internal combustion engine via a generator. In the overrun mode, the electric motor can be switched as a current generator for accessory drives of the vehicle. Such accessory drives are intended for additional devices that are mountable on the piste-maintenance vehicle, such as a rotary snow plow, a front snow plow blower, or the like, and/or for vehicle components, such as a tilting device for platform and driver's cab or for track tensioning. --.

lines 18-20, delete "the hydrostatic drive for the tracks is relatively heavy and the total drive system for the tracklaying vehicle is of a relatively poor efficiency." and insert therefor -- for instance electric motors for a snow plow shaft are directly controlled by a high-performance control unit, without any information being furnished on a dependence of such a control unit on

the vehicle speed, or the like. --.

Page 2, lines 2-5, delete "the tracklaying vehicle is more lightweight with the positive characteristics of the prior-art drive of the tracklaying vehicle being maintained, and that the efficiency of the tracklaying vehicle drive is increased at the same time, as well as the uniformity of piste maintenance." and insert therefor -- a uniform piste maintenance of an unvarying high quality is ensured independently of the vehicle speed or an uphill or downhill driving of the vehicle. --.

lines 8-27, delete "internal combustion engine is connected via a generator and at least one electric motor and possibly via a gear to each drive sprocket and that in the overrun mode the electric motor is switchable as a current generator for accessory drives designed as electrohydraulic or electric drives, with at least the electric drive for a shaft of the snow plow being synchronized with the electric motor of the drive sprocket.

In comparison with a known hydrostatic drive, the inventive use of generator and of at least one electric motor yields an equally good protection against and resistance to environmental factors and overloading. At the same time, the electric motor permits a precise control of the power transmission; due to the increased efficiency of the electric drive system the latter yields an identical or even increased tractive force on the drive sprocket and a vehicle performance comparable to or even better than that of a hydrostatic drive.

In the absence of all of the hydraulic components of the hydrostatic drive in the drive train, the inventive use of generator and electric motor considerably reduces the weight for the tracklaying vehicle. Furthermore, difficulties which might arise from sealing and from the hydraulic medium supply of the hydrostatic drive are not observed.";

and insert -- electric drive for a shaft of the snow plow is synchronized with the electric motor for the drive sprocket. It is thus possible to adapt snow plow shaft speed and travel speed to one another, resulting in a defined number of tooth engagements of the snow plow shaft per distance covered.

Furthermore, in comparison with hydrostatic drives that are known in practice, one generally obtains an equally good protection against and resistance to environmental factors and overloading. The electric motor permits a precise control of the power transmission. Due to the increased efficiency of the electric drive system the latter yields an identical or even increased tractive force on the drive sprocket and a vehicle performance comparable to or even better than that of a hydrostatic drive.

Since all of the hydraulic components of a hydrostatic drive in the drive train are no longer needed, the weight of the piste-maintenance vehicle is considerably reduced, and all difficulties that might arise from sealing and from the hydraulic medium supply of a hydrostatic drive are no longer observed. --.

Page 3, line 8, delete "an improved" and insert therefor -- a good --; and

lines 24-28, delete "To ensure a defined number of tooth engagements of the snow plow shaft per distance covered, and thus uniform piste maintenance work, it further turns out to be of advantage when the electric drive for the snow plow shaft is synchronized with the electric motor for the drive sprocket. The shaft speed and traveling speed can thus be adapted to each other.".

IN THE CLAIMS:

Please amend the claims as follows:

1 1. (Amended) A piste-maintenance tracklaying vehicle [(1)] comprising an internal
2 combustion engine [(2)] which is drivingly connected, preferably via a gear [(3, 13, 14)], to a
3 drive sprocket [(4)] of each track [(5)], and accessory drives [(6)] for additional devices [(7, 8,
4 9)] that are mountable on said tracklaying vehicle [(1)], such as rotary snow plow, front snow
5 [plow] blower, or the like, and/or for vehicle components [(15, 16, 17)], such as a tilting device
6 for [a] platform and driver's cab or track tensioner, [characterized in that said] with an internal
7 combustion engine [(2)] is being connected via a generator [(10)] and at least one electric motor
8 [(11, 12)] and possibly a gear [(13, 14)] to each drive sprocket [(4)], and in overrun mode said
9 electric motor [(11, 12)] is being switchable as a current generator for accessory drives [(6)]
10 designed as electrohydraulic or electric drives [(18, 19)], wherein at least said electric drive [(19)]
11 for a shaft of said rotary snow plow [being] is synchronized with the electric motor [(11, 12)] of
12 said drive sprocket [(4)].

1 2. (Amended) The tracklaying vehicle according to claim 1, [characterized in that]
2 wherein each drive sprocket [(4)] is drivingly connected to a separate electric motor [(11, 12)].

1 3. (Amended) The tracklaying vehicle according to claim 1, [or 2, characterized in that]
2 wherein a planetary gear [(13, 14)] is arranged between electric motor [(11, 12)] and drive

3 sprocket [(4)], and a steering gear [(3)] is arranged in the case of only one electric motor [(11,
4 12)] for the drive sprocket [(4)] of both tracks [(5)].

1 4. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein a hydraulic medium for said electrohydraulic drive [(18)]
3 is a medium based on water.

1 5. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein said tracklaying vehicle [(1)] is designed with an energy
3 buffer [(20)] which can be fed by said generator [(10)] or by said electric motor [(11, 12)] which
4 operates as a generator.

1 6. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein said tracklaying vehicle [(1)] comprises an electronic high-
3 performance means [(21)] for controlling travel engines or motors [(2, 11, 12)] and/or accessory
4 drives [(6)].

05912750

1 7. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein said internal combustion engine [(2)] comprises an
3 electronic engine control.

1 8. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that at least the] claim 1, wherein electrohydraulic function units [(22, 23)] for
3 performing vehicle functions [(15.18a)], for instance of the front and rear device carrier, are
4 arranged in a decentralized manner and comprise an electric motor, a pump, a control block and
5 a hydraulic medium tank.

1 9. (Amended) The tracklaying vehicle according to [any one of the preceding claims,
2 characterized in that] claim 6, wherein said electronic high-performance means [(21)] is centrally
3 arranged in said tracklaying vehicle [(1)] for distributing energy to all consumers [(6 to 9, 11, 12,
4 15 to 24)] and for energy feedback.

1 10. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein all components [(2, 3, 6 to 12, 15 to 25)] of said
3 tracklaying vehicle are composed in the manner of modules.

0597260

1 11. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 3, wherein said tracklaying vehicle [(1)] comprises a parking brake,
3 in particular as a multidisc brake integrated in the planetary gear [(13, 14)] which is operable by
4 a hydraulic medium based on water.

1 12. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein said tracklaying vehicle [(1)] comprises a winch [(24)] with
3 an electric drive [(19)].

1 13. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein said tracklaying vehicle [(1)] comprises a winch [(24)] with
3 an electric drive [(19)] designed for feeding back energy during downhill driving.

1 14. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein said tracklaying vehicle [(1)] comprises an energy feeding
3 means for the supply of external energy.

0697450

1 15. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 14, wherein said energy feeding means is designed as a trailing cable
3 or as a coupling system which is adapted to be coupled with contact wired or current rails.

1 16. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein said tracklaying vehicle [(1)] has an interconnection means
3 for the energetic connection to at least one further tracklaying vehicle.

1 17. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 6, wherein a heating means of said tracklaying vehicle [(1)] is fed with
3 waste feed from the motors [(11, 12)] of the hydraulic system [(18)] and/or said electronic high-
4 performance means [(21)].

1 18. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 6, wherein said tracklaying vehicle [(1)] comprises at least one
3 setpoint transmitter for at least the desired traveling speed.

1 19. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 18, wherein said electronic high-performance means [(21)] or [said]

3 a vehicle control unit, respectively, is connected to said setpoint transmitter and comprises an
4 electronic evaluation means at least for determining consumption-optimum speeds for said internal
5 combustion engine [(2)].

1 20. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein the gear ratio of snow plow shaft to drive sprocket is
3 adjustable.

1 21. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein a diagnosis means is arranged on said tracklaying vehicle
3 [(1)] for maintenance and inspection of [the] an electric control unit [(21, 22, 23)].

1 22. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 18, wherein said setpoint transmitter is designed as an accelerator for
3 controlling speed and for braking purposes.

1 23. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 18, wherein [the] a predetermined setpoint is a setpoint of the electric
3 motor speed.

09160-069T/60

1 24. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 23, wherein the setpoint is convertible by the electronic means into
3 a speed which is predetermined for said internal combustion engine.

1 25. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 6, wherein said electronic means comprises a characteristics control
3 unto for determining the consumption-optimum speed.

1 26. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 1, wherein said vehicle has a safety logic for starting and stopping
3 purposes, said logic sensing at least the position of a traveling direction switch, the actuation of
4 said accelerator and of said parking brake.

1 27. (Amended) The tracklaying vehicle according to [at least one of the preceding claims,
2 characterized in that] claim 11, wherein said parking brake is automatically operable.

REMARKS

The present preliminary amendment is submitted in order to correct minor deficiencies noted in the PCT application, and to correct the improper multiple dependency of claims as

originally filed to conform the application with U.S. practice.

Examination on the merits is respectfully requested.

Respectfully submitted,



Arlene J. Powers

Registration No. 35,985

Samuels, Gauthier & Stevens

225 Franklin Street, Suite 3300

Boston, Massachusetts 02110

Telephone: (617) 426-9180

Extension 110

4PRTS

09/171690

300 Rec'd PCT/PTO 23 OCT 1998

Piste-Maintenance Tracklaying Vehicle

The present invention relates to a piste-maintenance tracklaying vehicle comprising an internal combustion engine which is drivingly connected, preferably via a gear, to a drive sprocket of each track, and accessory drives for additional devices that are mountable on the piste-maintenance vehicle, such as rotary snow plow, front snow plow blower, or the like, and/or for vehicle components, such as a tilting device for platform and driver's cab or for track tensioning.

Such a tracklaying vehicle is known in practice, with a hydrostatic drive being normally provided for the tracks. The drive is operated by the internal combustion engine, with a gear being optionally provided between internal combustion engine and hydrostatic gear or drive sprocket for controlling the individual tracks. Furthermore, such a tracklaying vehicle has a number of additional devices, such as a rotary snow plow, a front snow plow blower, a winch drive, or the like. Furthermore, adjusting mechanisms for the corresponding device carriers or for a snow clearing blade are provided for the additional devices or also for further vehicles means, tilting devices are provided, for instance, for the driver's cab or a platform, as well as a track tensioner, or the like.

The prior-art tracklaying vehicle has the disadvantage that the hydrostatic drive for the tracks is relatively heavy and the total drive system for the tracklaying vehicle is of a relatively poor efficiency.

09/171690-10398

It is therefore the object of the present invention to improve a tracklaying vehicle of the above-mentioned type in such a manner that the tracklaying vehicle is more lightweight with the positive characteristics of the prior-art drive of the tracklaying vehicle being maintained, and that the efficiency of the tracklaying vehicle drive is increased at the same time, as well as the uniformity of piste maintenance.

In a tracklaying vehicle comprising the features of the preamble of claim 1, this object is achieved in that the internal combustion engine is connected via a generator and at least one electric motor and possibly via a gear to each drive sprocket and that in the overrun mode the electric motor is switchable as a current generator for accessory drives designed as electrohydraulic or electric drives, with at least the electric drive for a shaft of the snow plow being synchronized with the electric motor of the drive sprocket.

In comparison with a known hydrostatic drive, the inventive use of generator and of at least one electric motor yields an equally good protection against and resistance to environmental factors and overloading. At the same time, the electric motor permits a precise control of the power transmission; due to the increased efficiency of the electric drive system the latter yields an identical or even increased tractive force on the drive sprocket and a vehicle performance comparable to or even better than that of a hydrostatic drive.

In the absence of all of the hydraulic components of the hydrostatic drive in the drive train, the inventive use of generator and electric motor considerably reduces the weight for the tracklaying vehicle. Furthermore, difficulties which might arise from sealing and from the hydraulic medium supply of the hydrostatic drive are not observed.

Generator and electric motor and the corresponding connections between said members and to the internal combustion engine can be installed easily and without any major changes on the main frame of the tracklaying vehicle. Furthermore, an electric motor is exactly controllable in its performance and can be used as a brake during downhill driving or in the overrun mode, with energy being possibly fed back at the same time due to the generator effect of the electric motor.

In addition to an improved efficiency of the drive system, such an energy feedback effects a further reduction of the energy consumption, as the energy gained can for instance be used directly for operating the accessory drives for the additional devices.

The accessory drives for the additional devices which are mountable on the vehicle and/or for further vehicle components can be designed as electrohydraulic or electric drives. Electric drives may for instance be preferred for rotatory movements, for instance for a shaft of the rotary snow plow, for a front snow plow blower with screw and blower wheel, for a winch drive, or the like. Electrohydraulic drives can be used for the adjusting mechanisms at the front and rear on the tracklaying vehicle, for a parking brake, for tilting devices, for the track tensioner, or the like. The adjusting mechanisms serve, for instance, to adjust the corresponding device carrier at the front and rear and for adjusting various additional devices, such as front snow plow blower or snow clearing blade. A tilting device on the tracklaying vehicle serves to tilt the driver's cab or to tilt a loading platform of the tracklaying vehicle.

To ensure a defined number of tooth engagements of the snow plow shaft per distance covered, and thus uniform piste maintenance work, it further turns out to be of advantage when the electric drive for the snow plow shaft is synchronized with the electric motor for the drive sprocket. The shaft speed and traveling speed can thus be adapted to each other.

For instance, for exactly controlling each drive sprocket as such and thus for steering, for instance, the tracklaying vehicle through different rotational speeds of the drive sprockets, it turns out to be advantageous when each drive sprocket is connected to a separate electric motor.

For a corresponding motional connection of electric motor and drive sprocket, a planetary gear may be arranged between said members in a manner which is known per se or a steering gear may be arranged when only one electric motor is used for both drive sprockets.

When an electric motor is used for each drive sprocket, the electric motors can be coupled with one another when one of the electric motors fails. As a result, the tracklaying vehicle can also be moved onwards with only one electric motor.

When only one electric motor and one steering gear are used, these members can for instance be arranged centrally on the tracklaying vehicle, whilst planetary gears and drive sprocket form one respective unit and are spatially assigned to each track. Likewise, the planetary gears for the two drive sprockets of each track and the steering gear can form a unit which is for instance arranged on the vehicle in central fashion and is connected to the drive sprockets via a mechanical coupling of its own.

Instead of the electrohydraulic drives for the corresponding linear movements and small consumers, corresponding electric drives can also be used.

When electrohydraulic drives are used, it is of advantage for reasons of environmental protection when the corresponding hydraulic medium for the drive is a medium based on water.

To store the recovered energy which is not directly needed, during downhill driving or in the overrun mode of the tracklaying vehicle, the tracklaying vehicle may be designed in a further variant with an energy buffer as an additional device which can be fed by the generator or an electric motor operating as a generator. Such an energy buffer may be a conventional battery, a flywheel storage means, or the like.

To control the vehicle drive with internal combustion engine, generator and electric motor and to produce and distribute energy, the tracklaying vehicle comprises an electronic high-performance means at least for controlling travel motors and/or the accessory drives. For instance, speed, frequency and current intensity of the electric travel motors, of the snow plow drive, the drives of an electric winch or an electric front snow plow blower, or the like, can be controlled by the electronic high-performance means. Furthermore, the vehicle control unit in cooperation with the electronic high-performance means can control the energy production of internal combustion engine/generator and of electric motors or the energy consumption by the electric motors. Furthermore, the electronic means controls the switching of the electric motor to the current generator and thus to the energy supplier during downhill driving or in the overrun mode.

To use the internal combustion engine in a manner which is optimum for consumption and with less emissions, it is also advantageous when the internal combustion engine has an electronic engine control. The electronic engine control unit can communicate with the drive control unit or the electronic high-performance means and can be controlled by said means for controlling the engine speed in response to the amount of energy actually required.

When at least the electrohydraulic drives are arranged in a decentralized manner and

comprise an electric motor, a pump, a control block and a hydraulic medium tank, the corresponding hydraulic lines can be relatively short and said decentralized electrohydraulic drives may be fed via electric lines. As a result, said electrohydraulic drives can be arranged as compact units in the vicinity of the consumers proper. A gear pump may for instance be used as a corresponding pump for the hydraulic medium.

It is here also of relevance that such an electrohydraulic drive can, for instance, feed a plurality of consumers, such as a driver's cab tilting means and track tensioner, or the like.

To ensure easy access to the electronic high-performance means and to permit connections to all consumers that are as short as possible, the electronic high-performance means is centrally arranged in the tracklaying vehicle for distributing energy to all consumers and for energy feedback.

When all components of the tracklaying vehicle, in particular the electronic means and also the drive train, are composed as modules, the corresponding modules can be inserted or supplemented in all types of the tracklaying vehicles. The modules have corresponding standardized interfaces.

For additionally braking the tracklaying vehicle during standstill and for increasing safety, the tracklaying vehicle can comprise a parking brake, in particular a multidisc brake which is integrated in the planetary gearing.

When the tracklaying vehicle has a winch structure, with the winch including an electric drive, the drive may also be designed for energy feedback during downhill driving. The recovered energy can, for instance, be used for driving the snow plow

shaft or other accessory drives.

To feed the tracklaying vehicles externally with energy, in particular electric energy, the vehicle may comprise an energy feeding means. Preferably, said means is designed as a trailing cable or as a coupling system which can be coupled with contact wires or current rails.

In particular in frequently traveled sections of the pistes, the tracklaying vehicle can thus be moved without any emissions, while energy is fed through the contact wires or current rails. At the same time, the energy buffers of the vehicle can be loaded.

Corresponding current rails can, for instance, be mounted along lift sections or at the piste edge at a sufficiently safe height. These current rails may be carriers for floodlight installations at the same time. Furthermore, the tracklaying vehicle may alternatively be connected with its energy feeding means to current sources which are arranged at specific locations, for instance along the piste.

It should here be noted that in tracklaying vehicles which are preferably used with indoor skiing, energy is exclusively supplied via the energy feeding means. In such a case the internal combustion engine with corresponding generator and the necessary accessory units, such as engine cooling system, starters, dynamo, fuel tank, starter battery, etc. can be dispensed with. During a purely electric operation of the tracklaying vehicle, the weight is further reduced considerably.

Coupling to the contact wires or the current rails can be carried out via a winch structure, with the external electric energy being supplied via a line to the reel.

For instance, in order to use and feed several tracklaying vehicles jointly when pistes

are being maintained, such a tracklaying vehicle equipped with an external electric energy supply can comprise an interconnection means for energetic connection to at least one further tracklaying vehicle. Electric energy can thereby be transmitted between the connected tracklaying vehicles. Of course, a plurality of tracklaying vehicles can be interconnected in this manner.

The novel drive train of the tracklaying vehicle offers many possibilities of heating the tracklaying vehicle. The vehicle can, for instance, be supplied with exhaust heat from the engines and motors (diesel and/or electric) and/or the hydraulic system and/or the electronic high-performance means. Furthermore, an electric heating means may for instance be used in addition.

For a simplified operation or control of the tracklaying vehicle, the latter may comprise a setpoint transmitter at least for the desired traveling speed. The transmitter may be designed as a standard accelerator. The traveling speed is selected through the corresponding position of the setpoint transmitter and the electric motor speed is adjusted accordingly.

In an advantageous embodiment the electronic high-performance means and the vehicle control unit, respectively, are connected to the setpoint transmitter and comprise an electronic evaluation means at least with a stored consumption-optimum speed characteristic for the internal combustion engine.

Depending on the travel resistance, the corresponding setpoint is converted into a corresponding high-performance requirement and into a speed predetermined for the internal combustion engine by the electronic means in consideration of the instantaneous power requirements of other consumers, such as the accessory drives or the like. A consumption-optimum speed is predetermined by the speed

characteristic for the power output required.

Operative states in the partial load range that is disadvantageous for consumption are avoided by the inventive control. For instance, the electronic means can effect a readjustment, i.e. speeding up of the internal combustion engine along a consumption-optimum curve of the characteristic until the speed predetermined by the setpoint transmitter (accelerator) or the corresponding electric motor speed is again reached.

For instance, in order to achieve an increased tooth engagement frequency per distance in the case of rough pistes, the gear ratio of snow plow shaft to drive sprocket can be adjusted. This can, for instance, be carried out via a snow plow potentiometer.

To simplify and accelerate maintenance and inspection of the tracklaying vehicle, a diagnosis means may be arranged on the tracklaying vehicle. The diagnosis means is preferably designed as a diagnosis box through which the electric control, in particular, including the electronic high-performance means of the tracklaying vehicle, can be checked in a manner which is known per se.

In a simple embodiment a setpoint transmitter may be designed as an accelerator for predetermining the vehicle speed. The driver chooses the desired travel speed through the accelerator position. In a development of the invention, the speed corresponds to a setpoint for the electric motor speed. The setpoint is also predetermined for a reduction of the speed, so that the vehicle can be braked by a slight operation of the accelerator.

Depending on the actual travel resistance during uphill or downhill driving, a corresponding performance requirement, i.e. a corresponding drive or brake

performance, is produced by the setpoint of the electric motor speed. It is here of advantage when such an actual performance requirement is converted by the electronic means into a speed predetermined for the diesel engine, and it is also of advantage when the speed which is consumption-optimum for the power output required is predetermined by means of a characteristic control through the electronic means. Operative states in a partial load range which is disadvantageous for consumption are thereby avoided.

For instance during uphill driving, the electronic means effects a running up of the diesel engine along the consumption-optimum curve of the characteristic until the speed which is predetermined by the accelerator, or the electric motor speed is again reached. During a braking operation, the braking current control and the electric travel motors, respectively, are controlled via the electronic travel means. The electric travel motors operate as generators in such a case and feed energy back into the system. The remaining energy for other consumers, for instance a rotary snow plow, is provided by the internal combustion engine which is controlled as above. When there is excessive energy of the total system for a short period of time, for instance in case of a rapid emergency stop, the excessive energy is discharged in the conventional manner via brake resistors.

To facilitate starting and stopping operations on a hill, the vehicle has an additional safety logic. This logic may be part of the electronic means of the vehicle control unit or the electronic high-performance means. The electronic safety means checks at least the position of a traveling direction switch, the actuation of the accelerator and the parking brake.

A start during uphill or downhill driving is, for instance, effected in that in successive order the traveling direction switch is operated, the parking brake is released, the

vehicle is prevented from rolling by means of power-supplied electric motors, the accelerator is operated and the piste-maintenance vehicle is moved in the end. In a development of the invention, the parking brake is operated automatically, a release of the parking brake being effected during start upon operation of the accelerator.

A stopping operation during uphill or downhill driving is effected by means of a safety logic in that in successive order the accelerator position is moved to the zero position, whereby the piste-maintenance vehicle is slowed down in a controlled manner and stopped, the vehicle is prevented from rolling by a further power supply to the electric motors, the parking brake is automatically operated after a defined stopping time, and the power supply to the electric motors is terminated and the internal combustion engine is further operated in the idling speed mode. The traveling direction switch can then be moved to the neutral position.

The above-described control by means of a setpoint or by means of the safety logic can be performed through a separate electronic control means or an electronic means contained in the vehicle control unit or the electronic high-performance means.

Advantageous embodiments of the present invention will now be explained and described in more detail with reference to the figures attached to the drawing, in which:

Fig. 1 is a block diagram regarding drive and supply of a tracklaying vehicle;

Fig. 2 shows various variants of arranging electric motors and gears;

Fig. 3 is a side view of a first embodiment of a tracklaying vehicle; and

Fig. 1 is a block diagram for drive and supply with additional devices and further vehicle components.

An electronic high-performance means 21 which can be fed with current from the generator 10 is centrally arranged in the tracklaying vehicle 1, of which Fig. 1 only shows the principle. The electronic high-performance means 21 controls downstream electric motors 11, 12 for driving the tracklaying vehicle 1. These motors are drivingly connected via corresponding gears 3, 13, 14 to the drive sprockets 4 of the tracks of the tracklaying vehicle 1.

Furthermore, there is provided a vehicle control unit 28 which on the basis of corresponding predetermined setpoints of accelerator 29 and steering wheel 30 controls as a setpoint transmitter both the internal combustion engine 2 and the electronic high-performance means 21 and transmits the setpoints as control

variables.

Depending on the power consumption, the electronic high-performance means 21 can influence the engine speed of the internal combustion engine 2 via the vehicle control unit 28.

Furthermore, the electronic high-performance means 21 is connected to various accessory drives 6. Two of the accessory drives 6 are formed as electrohydraulic drives 18 with electric motor, hydraulic pump and corresponding hydraulic medium supply vessel. These accessory drives are assigned to a front control block 22 and a rear control block 23, respectively.

Two further accessory drives are designed as electric motors 19, optionally with associated gear. One of said accessory drives serves to drive an additional device 7, such as an electric winch by which energy can also be fed back to the electronic high-performance means 21 in accordance with the direction of arrow during downhill driving or in the overrun mode.

The other accessory drive 6 with the electric drive 19 is assigned to a further additional device 8, such as a rotary snow plow.

Finally, in a further embodiment the electronic high-performance means 21 is additionally connected to an energy buffer 20, such as a battery or a flywheel storage means, for storing and supplying energy.

Fig. 2 shows four different examples of arranging the electric motors 11, 12, associated gears 3, 13, 14 and drive sprockets 4.

In the example which is illustrated at the left side, a separate electric motor 11, 12 is provided for each drive sprocket of a track of the tracklaying vehicle. Corresponding gears 13, 14, which may be designed as planetary gears, are directly assigned to each drive sprocket 4, with the electric motors being centrally assigned to the vehicle frame, and the gears 13, 14 and drive sprockets 4 in spatially direct fashion to the tracks.

In the subsequent example of arrangement, the electric motors 11, 12 with the interposed gears 13, 14 are directly arranged at the drive sprockets 4 and are thus directly assigned to the tracks.

In the next example of arrangement, an electric motor 11, 12 is provided which via a steering gear 3 is assigned to both planetary gears 13, 14 with associated drive sprocket 4. In this example, the electric motor 11, 12 and the steering gear 3 are centrally arranged on the vehicle frame, and the planetary gears 13, 14 are directly assigned to the drive sprockets 4.

In the last-mentioned example of arrangement, the steering gear 3 and the planetary gears 13, 14 are combined to form a unit and, like the individual electric motor 11, 12, are centrally arranged on the vehicle frame. In this case, it is only the drive sprockets 4 that are directly arranged in or on the track.

Fig. 3 is a side view of a tracklaying vehicle 1 according to the invention.

The drive train proper, which consists of internal combustion engine 2, generator 10, electronic high-performance means 21 and electric motor 11 for the drive sprocket 4, is arranged in the illustrated embodiment substantially centrally in the longitudinal direction of the tracklaying vehicle 1. As for the spatial arrangement of the

components, there is maximum freedom of design by virtue of the electrical connection of said components; as a consequence, it is possible to arrange the drive train on the tracklaying vehicle in different ways. In the illustrated embodiment, the electric motor 11 is directly assigned to the drive sprocket 4 which drives a track 5.

The tracklaying vehicle 1 comprises as further vehicle components 15, 16 a loading platform 31 and a driver's cab 32. These parts are tiltable by electric or electrohydraulic drives (not shown).

A control block 22 and 23, respectively, is arranged at the front and at the rear of the tracklaying vehicle 1. By analogy with Fig. 1, the block is designed with an electrohydraulic drive 18 as the accessory drive 6. These control blocks 22, 23 serve, for instance, to operate an adjusting means for push frame, front snow plow blower or device carrier, which are not illustrated for the sake of simplicity. Reference numerals 9 and 18a outline only the principle of a front snow plow blower to be arranged on the corresponding front device carrier 18a of the tracklaying vehicle 1.

The vehicle control unit 28 and a diagnosis means 25 are arranged inside the driver's cab. The diagnosis means serves maintenance and inspection purposes. The diagnosis means can also be arranged at a different location of the tracklaying vehicle 1.

Fig. 4 is a side view illustrating a further embodiment of a tracklaying vehicle 1. Like reference numerals designate like parts and are only mentioned in part.

At the rear of the tracklaying vehicle 1, a rotary snow plow with a downstream smoothing blade is arranged as an additional device 8. The snow plow comprises a shaft which is driven by an electric drive 19. The additional device 8 is adjustably and

pivotably supported at the rear of the tracklaying vehicle 1 via a corresponding kinematic adjusting means with electrohydraulic drive 18.

The kinematic adjusting means for the additional device 8 can be operated via the rear control block 23, the electrohydraulic drive 18 being contained in the rear control block 23 in such a case.

A winch which comprises a reel with an electric drive 19 is arranged as a further additional device 7 on the loading platform 31.

Further additional devices or vehicle components, such as track tensioner, parking brake, front device carrier, or the like, are not shown in Figs. 3 and 4 for reasons of simplification.

CLAIMS

1. A piste-maintenance tracklaying vehicle (1) comprising an internal combustion engine (2) which is drivingly connected, preferably via a gear (3, 13, 14), to a drive sprocket (4) of each track (5), and accessory drives (6) for additional devices (7, 8, 9) that are mountable on said tracklaying vehicle (1), such as rotary snow plow, front snow plow blower, or the like, and/or for vehicle components (15, 16, 17), such as a tilting device for a platform and driver's cab or track tensioner, **characterized in** that said internal combustion engine (2) is connected via a generator (10) and at least one electric motor (11, 12) and possibly a gear (13, 14) to each drive sprocket (4), and in overrun mode said electric motor (11, 12) is switchable as a current generator for accessory drives (6) designed as electrohydraulic or electric drives (18, 19), at least said electric drive (19) for a shaft of said rotary snow plow being synchronized with the electric motor (11, 12) of said drive sprocket (4).
2. The tracklaying vehicle according to claim 1, **characterized in** that each drive sprocket (4) is drivingly connected to a separate electric motor (11, 12).
3. The tracklaying vehicle according to claim 1 or 2, **characterized in** that a planetary gear (13, 14) is arranged between electric motor (11, 12) and drive sprocket (4), and a steering gear (3) is arranged in the case of only one electric motor (11, 12) for the drive sprocket (4) of both tracks (5).
4. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that a hydraulic medium for said electrohydraulic drive (18) is a medium based on water.

5. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that said tracklaying vehicle (1) is designed with an energy buffer (20) which can be fed by said generator (10) or by said electric motor (11, 12) which operates as a generator.
6. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that said tracklaying vehicle (1) comprises an electronic high-performance means (21) for controlling travel engines or motors (2, 11, 12) and/or accessory drives (6).
7. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that said internal combustion engine (2) comprises an electronic engine control.
8. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that at least the electrohydraulic function units (22, 23) for performing vehicle functions (15.18a), for instance of the front and rear device carrier, are arranged in a decentralized manner and comprise an electric motor, a pump, a control block and a hydraulic medium tank.
9. The tracklaying vehicle according to any one of the preceding claims,
characterized in that said electronic high-performance means (21) is centrally arranged in said tracklaying vehicle (1) for distributing energy to all consumers (6 to 9, 11, 12, 15 to 24) and for energy feedback.
10. The tracklaying vehicle according to at least one of the preceding claims,

characterized in that all components (2, 3, 6 to 12, 15 to 25) of said tracklaying vehicle are composed in the manner of modules.

11. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that said tracklaying vehicle (1) comprises a parking brake, in particular as a multidisc brake integrated in the planetary gear (13, 14), which is operable by a hydraulic medium based on water.
12. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that said tracklaying vehicle (1) comprises a winch (24) with an electric drive (19).
13. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that said tracklaying vehicle (1) comprises a winch (24) with an electric drive (19) designed for feeding back energy during downhill driving.
14. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that said tracklaying vehicle (1) comprises an energy feeding means for the supply of external energy.
15. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that said energy feeding means is designed as a trailing cable or as a coupling system which is adapted to be coupled with contact wires or current rails.
16. The tracklaying vehicle according to at least one of the preceding claims,
characterized in that said tracklaying vehicle (1) has an interconnection means

for the energetic connection to at least one further tracklaying vehicle.

17. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that a heating means of said tracklaying vehicle (1) is fed with waste feed from the motors (11, 12) of the hydraulic system (18) and/or said electronic high-performance means (21).
18. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that said tracklaying vehicle (1) comprises at least one setpoint transmitter for at least the desired traveling speed.
19. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that said electronic high-performance means (21) or said vehicle control unit, respectively, is connected to said setpoint transmitter and comprises an electronic evaluation means at least for determining consumption-optimum speeds for said internal combustion engine (2).
20. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that the gear ratio of snow plow shaft to drive sprocket is adjustable.
21. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that a diagnosis means is arranged on said tracklaying vehicle (1) for maintenance and inspection of the electric control unit (21, 22, 23).
22. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that said setpoint transmitter is designed as an accelerator

09171650.10399
052017-052017

for controlling speed and for braking purposes.

23. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that the predetermined setpoint is a setpoint of the electric motor speed.
24. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that the setpoint is convertible by the electronic means into a speed which is predetermined for said internal combustion engine.
25. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that said electronic means comprises a characteristics control unit for determining the consumption-optimum speed.
26. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that said vehicle has a safety logic for starting and stopping purposes, said logic sensing at least the position of a traveling direction switch, the actuation of said accelerator and of said parking brake.
27. The tracklaying vehicle according to at least one of the preceding claims, **characterized in** that said parking brake is automatically operable.

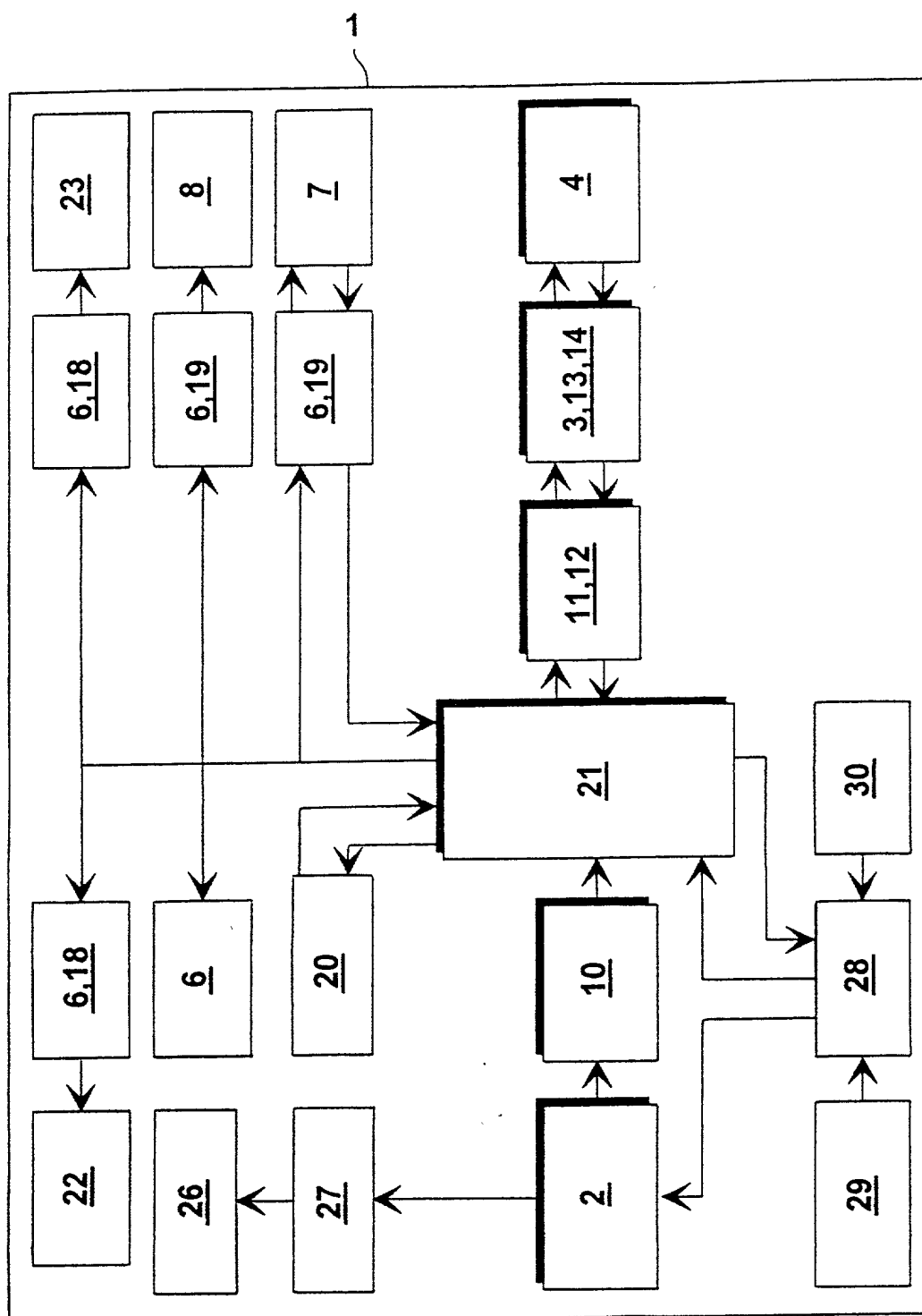


FIG. 1

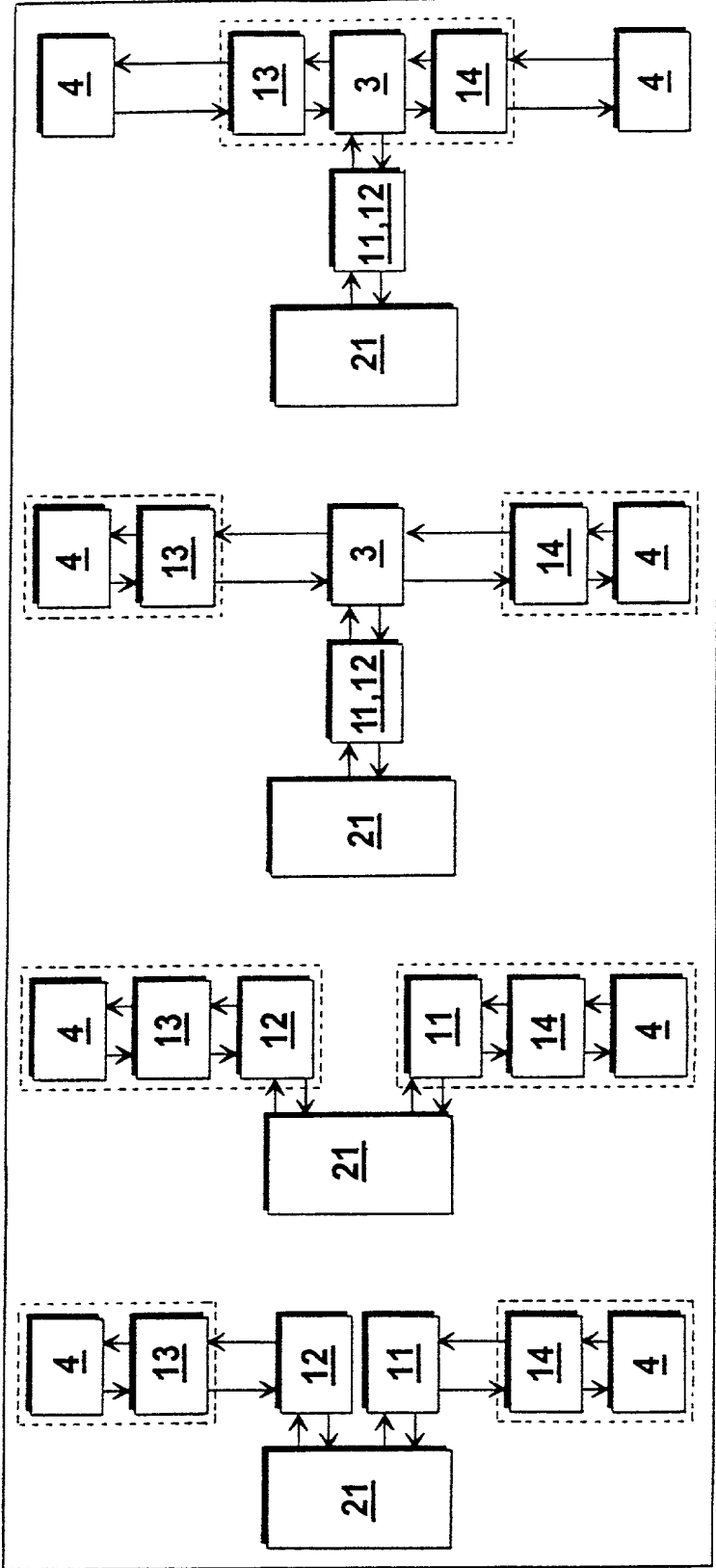
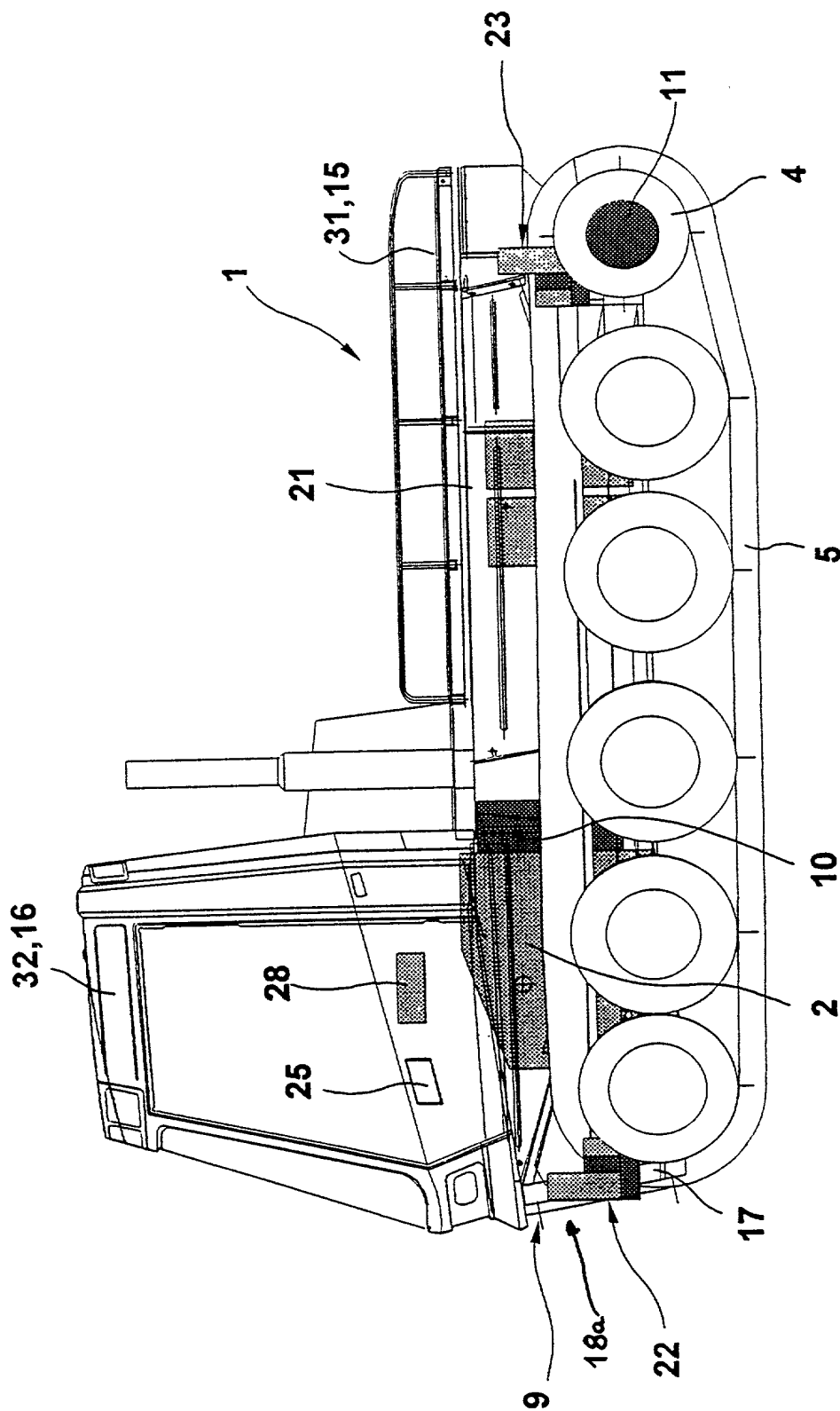


FIG.2



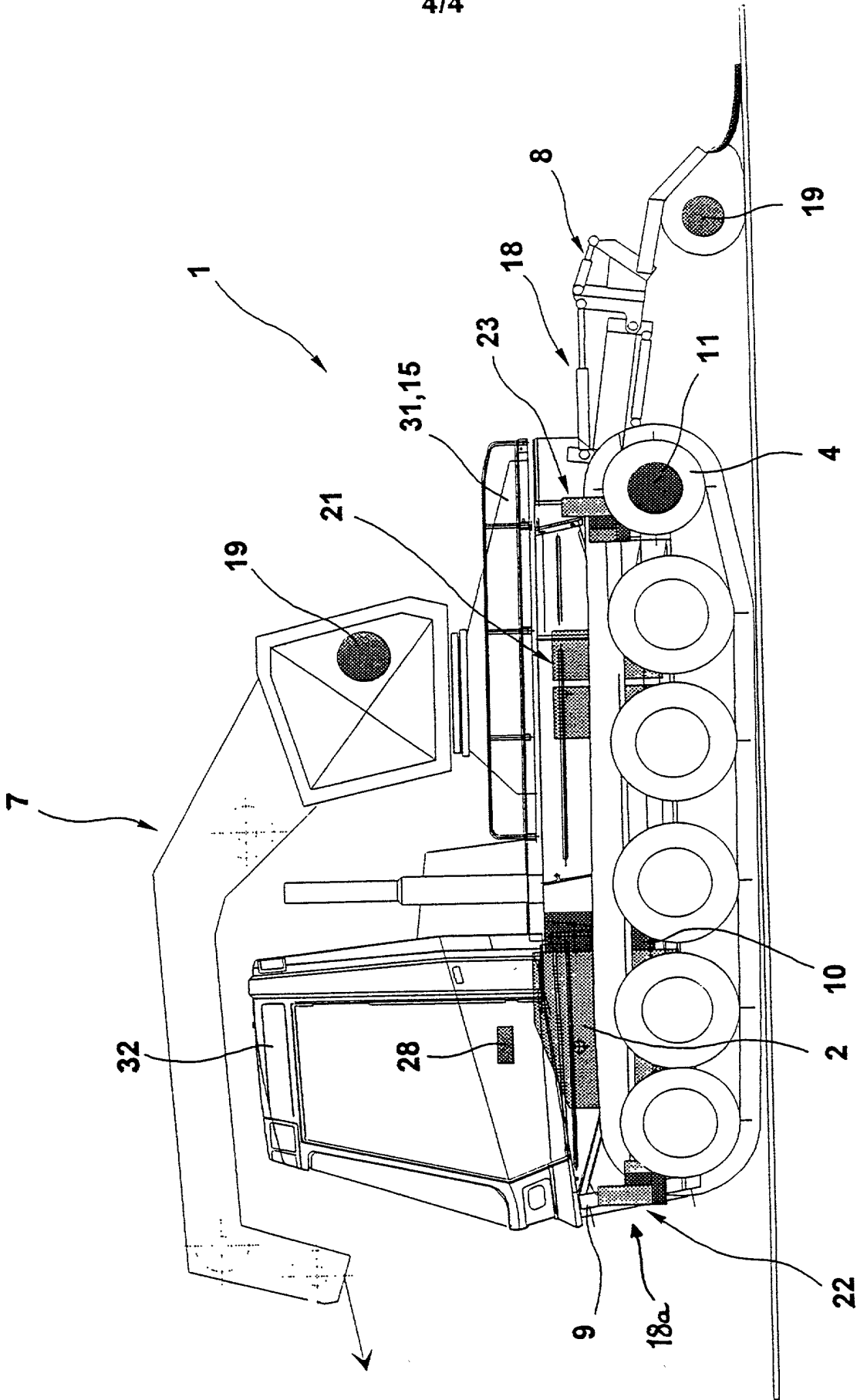


FIG. 4

**ADDED PAGE TO COMBINED DECLARATION AND POWER OF
ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION**

(complete this part only if this is a divisional, continuation or C-I-P application)

**CLAIM FOR BENEFIT OF EARLIER U.S./PCT APPLICATION(S) UNDER
35 U.S.C. 120**

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information that is material to the examination of this application, namely, information where there is substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 USC 120:					
U.S. APPLICATIONS			Status (Check One)		
U.S. APPLICATIONS	U.S. FILING DATE		Patented	Pending	Abandoned
1. 0_/_/_					
2. 0_/_/_					
3. 0_/_/_					
PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLI- CATION NO.	PCT FILING DATE	U.S. SERIAL NOS. ASSIGNED (if any)			
4. PCT/EP97/02151	25 April 1997				
5.					
6.					

**35 USC 119 PRIORITY CLAIM, IF ANY, FOR ABOVE LISTED U.S./PCT
APPLICATIONS**

ABOVE APPLICATION NO.	DETAILS OF FOREIGN APPLICATION FROM WHICH PRIORITY CLAIMED UNDER 35 USC 119		
	Country and Application No.	Date of filing (day, month, year)	Date of issue (day, month, year)
1. PCT/EP97/02151	DE 296 07 651.1	26 April 1996	
2.			
3.			
4.			
5.			
6.			

0697/02151

Attorney's Docket No. 4501**COMBINED DECLARATION AND POWER OF ATTORNEY***(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL,
CONTINUATION OR CIP)*

As a below named inventor, I hereby declare that:

TYPE OF DECLARATIONThis declaration is of the following type: *(check one applicable item below)*

- ☐ original
☐ design
☐ supplemental

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

☒ national stage of PCT (under 35 U.S.C. §371)

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR CIP.

- ☐ divisional
☐ continuation
☐ continuation-in-part (CIP)

INVENTORSHIP IDENTIFICATION

WARNING: If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTIONPISTE-MAINTENANCE TRACKLAYING VEHICLE**SPECIFICATION IDENTIFICATION**the specification of which: *(complete (a), (b) or (c))*

- (a) ☐ is attached hereto.
- (b) ☐ was filed on _____ as Serial No. 0 / _____, or Express Mail
No., as Serial No. not yet known _____ and was amended on _____
 _____ *(if applicable)*.

NOTE: Amendments filed after the original papers are deposited with the PTO which contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

- (c) ☒ was described and claimed in PCT International Application No. PCT/EP97/02151 filed on April 25, 1997 and as amended under PCT Article 19 on _____ *(if any)*.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information

X which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56

(also check the following items, if desired)

— and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent, and

— In compliance with this duty there is attached an information disclosure statement in accordance with 37 CFR 1.98.

PRIORITY CLAIM (35 U.S.C. § 119)

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

(d) — no such applications have been filed.

(e) X such applications have been filed as follows.

NOTE: Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

A. PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 37 USC 119
			— YES NO —
			— YES NO —
			— YES NO —
			— YES NO —
			— YES NO —

ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

PCT PCT/EP97/02151 Filed 25 April 1997

Germany 296 07 651.1 Filed 26 April 1996

NOTE: If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CIP APPLICATION for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. § 120.

POWER OF ATTORNEY

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (*List name and registration number*)

7
Maurice E. Gauthier - 20,798
I. Stephen Samuels, - 20,919
Richard L. Stevens - 24,445

Matthew E. Connors - 33,298
Arlene J. Powers - 35,985
William E. Hilton - 35,192
Patrick J. O'Shea - 35,305

(*check the following item, if applicable*)

— Attached as part of this declaration and power of attorney is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

SEND CORRESPONDENCE TO

DIRECT TELEPHONE CALLS TO:
(*Name and telephone number*)

Arlene J. Powers
Samuels, Gauthier, Stevens & Reppert
225 Franklin Street
Suite 3300
Boston, Massachusetts 02110

Arlene J. Powers
(617) 426-9180
Extension 110

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name as it should appear on the filing receipt and all other documents.

Full name of sole or first inventor

100 Helmut
(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

Kanzler
FAMILY (OR LAST NAME)

Inventor's signature

Date 24.08.98 Country of Citizenship Germany

Residence Obere Hauptstrasse 39, D-89269 Voehringen GERMANY DEX

Post Office Address same as residence

Full name of second joint inventor, if any

200 Michael
(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

Kuhn
FAMILY (OR LAST NAME)

Inventor's signature

Date 24.08.98 Country of Citizenship Germany

Residence Apfelblutenweg 3, D-89171 Illerkirchberg GERMANY DEX

Post Office Address same as residence

Full name of third joint inventor, if any

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Inventor's signature

Date Country of Citizenship

Residence

Post Office Address

**CHECK PROPER BOX(ES) FOR ANY OF THE FOLLOWING ADDED PAGE(S) WHICH
FORM A PART OF THIS DECLARATION**

— Signature for third and subsequent joint inventors. *Number of pages added* _____.

* * *

— Signature by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added* _____.

* * *

— Signature for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47. *Number of pages added* _____.

* * *

— Added page for signature by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time (37 CFR 1.47).

* * *

X Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

X Number of pages added 2

* * *

— Authorization of attorney(s) to accept and follow instructions from representative.

* * *

(If no further pages form a part of this Declaration, then end this Declaration with this page and check the following item.)

— This declaration ends with this page.

031690697260